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Assessment of Soil Fertility in Mulberry Cultivation Areas of Tamil Nadu, India

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Abstract

Sericulturists recently encountered reduced leaf yields and difficulties in silkworm rearing due to nutrient deficiencies in mulberry leaves caused by insufficient soil fertilization, leading to research on soil fertility status for optimal mulberry cultivation in Tamil Nadu. A total of 2,630 soil samples were gathered from various locations across the state and examined for 12 chemical properties. Of these, 83.27% were identified as alkaline (pH > 7.8) and non-saline (EC < 1 mmhos cm^{-1}). The content of organic carbon was low in 64.33% of the samples (<0.65%), while 38.75% and 35.1% exhibited medium (260-560 kg ha^{-1}) to high (>560 kg ha^{-1}) levels of available nitrogen. High levels of available phosphorus (P_2O_5 > 25 kg ha^{-1}) were found in 45.01% of the samples, while 59.43% had high potassium (K_2O > 240 kg ha^{-1}). Sulphur content was low (<10 ppm) in 38.52% of the samples. DTPA-extractable micronutrients revealed that manganese (Mn) levels were medium in 23.8% of the samples (2-4 ppm) and high in 53% (>4 ppm). In contrast, boron (B) levels were low in 79.20% of the samples (<0.5 ppm). Iron (Fe) was found to be low (<4.5 ppm) in 84.71% of samples, zinc (Zn) was deficient (<0.6 ppm) in 57.52% and copper (Cu) was high (>0.4 ppm) in 89.88%. The study concluded that the majority of mulberry cultivation areas in Tamil Nadu have slightly alkaline soils, with deficiencies in micronutrients and organic carbon.

Keywords: Chemicals, Macronutrients, Micronutrients, Mulberry, Silkworm, Soil

Introduction

India's total agricultural cropland spans approximately 82.6 million hectares, equivalent to 215.6 million acres. Of this, around 48.92 million hectares are under cultivation in Tamil Nadu, making it a significant contributor to the country's agriculture. Tamil Nadu ranks as the 3rd largest producer of coconut and silk in India, with mulberry cultivation covering about 46,570.25 hectares. Effective soil fertility management is crucial for sustaining crop production. Soil fertility is crucial for optimal plant growth, relying on a balanced supply of fertilizers delivered at the correct times and in the required amounts. Among the 16 essential nutrients needed by plants, macronutrients are need in larger quantities, while micronutrients, though essential in smaller amounts, are just as important. Both macro- and micronutrients play vital roles in plant health, including supporting essential enzymatic functions, ensuring robust growth and development (Rajkumar *et al.*, 1996). Micronutrient availability in soil is highly responsive to environmental factors such as soil pH, lime content and organic matter levels. Soil erosion remains a significant issue, increasing the need for sustainable sericulture practices that reduce reliance on external inputs (Sheeja *et al.*, 1994). Research shows that applying the full recommended amount of fertilizers, together with liquid Bio-NPK and zinc-solubilizing bacteria, improves both crop yield and nutrient content more effectively than individual applications (Singh *et al.*, 2022). Nutrient deficiencies in soil are evident when essential nutrients are missing, underscoring the need to provide all necessary nutrients for optimal crop growth (Rana *et al.*, 2014). This is especially crucial for mulberry cultivation, as mulberry leaves are the sole food source for the silkworm *Bombyx mori* L. and

Article History

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Table 1: Soil pH, EC, OC and macronutrients status in mulberry growing soils of Tamil Nadu State

Name of the clusters and non-captive areas	No. of samples	pH			EC (mmhos cm^{-1})	Organic carbon (OC) (%)		
		L	M	H	N	L	M	H
Adaikalapattinam	104	1	43	60	104	46	56	2
	%	0.96	41.35	57.69	100	44.23	53.85	1.92
Alangayam	89	0	23	66	89	75	10	4
	%	0	66	74.16	100	84.27	11.24	4.49
Alangudi	103	0	36	67	103	65	33	5
	%	0	34.95	65.05	100	63.11	32.04	4.85
Berigai	160	3	77	80	160	90	56	14
	%	1.88	48.13	50	100	56.25	35	8.75
Bhavani	100	0	0	100	100	87	11	2
	%	0	0	100	100	87	11	2
Dharmapuri	120	1	33	86	120	68	34	8
	%	0.83	27.5	71.67	100	56.67	28.33	6.67
Gobichet Ipalayam	100	0	4	96	100	58	40	2
	%	0	4	96	100	58	40	2
Gudimangalam	38	0	4	34	38	30	4	4
	%	0	10.53	89.47	100	78.95	10.53	10.5
Keeranur	33	1	6	26	33	23	10	0
	%	3.03	18.18	78.79	100	69.7	30.3	0
Komaralingam	42	0	4	38	42	31	11	0
	%	0	9.52	90.48	100	73.81	26.19	0
Madathukulam	121	2	7	112	121	84	28	9
	%	1.65	5.79	92.56	100	69.42	23.14	7.44
Manurpalayam	55	0	8	47	55	51	4	0
	%	0	14.55	85.45	100	92.73	7.27	0
Namakkal	345	0	53	292	345	234	100	11
	%	0	15.36	84.64	100	67.83	28.99	3.19
Oddanchatiram	89	0	14	75	89	62	26	1
	%	0	15.73	84.27	100	69.66	29.21	1.12
Palani	7	0	0	7	7	6	1	0
	%	0	0	100	100	85.71	14.29	0
Pennagaram	348	1	28	319	348	195	143	10
	%	0.29	8.05	91.67	100	56.03	41.09	2.87
Pitchandapalayam	100	0	0	100	100	56	19	25
	%	0	0	100	100	56	19	25
Pollachi	101	1	16	84	101	72	27	2
	%	0.99	15.84	83.17	100	71.29	26.73	1.98
Poolavadi	72	1	3	68	72	56	16	0
	%	1.39	4.17	94.44	100	77.78	22.22	0
Pongalur	12	0	1	11	12	10	2	0
	%	0	8.33	91.67	100	83.33	16.67	0

Table 1: Continue...

Name of the clusters and non-captive areas	No. of samples	pH			EC (mmhos cm^{-1})	Organic carbon (OC) (%)		
		L	M	H	N	L	M	H
Salem	54	2	8	44	54	33	19	2
	%	3.7	14.81	81.48	100	61.11	35.19	3.7
Sanarpatti	10	0	1	9	10	5	5	0
	%	0	10	90	100	50	50	0
Sriviiliputtur	118	2	42	74	118	70	36	12
	%	1.69	35.59	62.71	100	59.32	30.51	10.2
Udumalpet	91	0	10	81	91	56	32	3
	%	0	10.99	89.01	100	61.54	35.16	3.30
Uthangarai	202	0	38	202	202	113	72	17
	%	0	18.81	100	100	55.94	35.64	8.42
Villupuram	16	0	4	12	16	16	0	0
	%	0	25	75	100	100	0	0
Total samples	2630	15	463	2190	2630	1692	795	133
	%	0.57	17.60	83.27	100	64.33	30.22	5.06

Table 1: Continue...

Table 1: Soil pH, EC, OC and macronutrients status in mulberry growing soils of Tamil Nadu State

Name of the clusters and non-captive areas	Available Nitrogen (N) (kg ha^{-1})			Available Phosphorus (P_2O_5) (kg ha^{-1})			Available Potash (K_2O) (kg ha^{-1})		
	L	M	H	L	M	H	L	M	H
Adaikalapattinam	11	35	58	37	56	11	3	21	80
	10.58	33.65	55.77	35.58	53.85	10.58	2.88	20.19	76.92
Alangayam	30	46	13	5	16	68	26	42	21
	33.71	51.69	14.61	5.62	68	76.4	29.21	47.19	23.6
Alangudi	28	37	38	26	23	54	7	42	54
	27.18	35.92	36.89	25.24	22.33	52.43	6.8	40.78	52.43
Berigai	61	32	67	47	38	75	12	79	69
	38.13	20	41.88	29.38	23.75	46.88	7.5	49.38	43.13
Bhavani	30	57	13	5	34	61	1	14	85
	30	57	13	5	34	61	1	14	85
Dharmapuri	25	43	52	15	7	98	9	46	65
	20.83	35.83	43.33	12.5	5.83	81.67	7.5	38.33	54.17
Gobichet Ipalayam	31	27	42	77	22	1	5	31	64
	31	27	42	77	22	1	5	31	64
Gudimangalam	18	14	7	32	4	2	2	13	23
	47.36	36.84	18.42	84.21	10.53	5.26	5.26	34.21	60.53
Keeranur	13	13	7	25	2	6	2	10	21
	39.39	39.39	21.21	75.76	6.06	18.18	6.06	30.3	63.64
Komaralingam	18	13	11	30	2	10	0	5	37
	42.86	30.95	26.19	71.43	4.76	23.81	0	11.9	88.1
Madathukulam	32	53	36	74	18	29	10	42	69
	26.45	43.8	29.75	61.16	14.88	23.97	8.26	34.71	57.02

Table 1: Continue...

Name of the clusters and non-captive areas	Available Nitrogen (N) (kg ha^{-1})			Available Phosphorus (P_2O_5) (kg ha^{-1})			Available Potash (K_2O) (kg ha^{-1})		
	L	M	H	L	M	H	L	M	H
Manurpalayam	17	34	3	39	14	2	0	7	48
	30.91	61.82	5.45	70.91	25.45	3.64	0	12.73	87.27
Namakkal	111	123	111	2	113	230	30	144	171
	32.17	35.65	32.17	0.58	32.75	66.67	8.7	41.74	49.57
Oddanchatiram	17	45	27	19	38	0	1	19	0
	19.1	50.56	30.34	21.35	42.47	0	1.12	21.35	0
Palani	1	5	1	6	1	0	0	5	2
	14.29	71.43	14.29	85.71	14.29	0	0	71.43	28.57
Pennagaram	79	116	153	1	19	328	44	116	188
	22.7	33.33	43.97	0.29	5.46	94.25	12.64	33.33	54.02
Pitchandapalayam	10	47	43	72	21	17	2	28	70
	10	47	43	72	21	17	2	28	70
Pollachi	23	49	29	94	5	2	2	28	71
	22.77	48.51	28.71	93.07	4.95	1.98	1.98	27.72	70.3
Poolavadi	29	27	16	54	10	8	0	1	71
	40.28	37.5	22.22	75	13.89	11.11	0	1.39	98.61
Pongalur	2	8	2	11	1	0	0	2	10
	16.67	66.67	16.67	91.67	8.33	0	0	16.67	83.33
Salem	12	21	21	2	2	50	3	18	32
	22.22	38.89	38.89	3.7	3.7	92.59	5.56	33.33	59.26
Sanarpatti	1	6	3	6	4	0	1	2	7
	30	60	10	60	40	0	10	20	70
Sriviiliputtur	13	57	48	106	12	0	2	26	90
	11.02	48	40.68	89.83	10.17	0	1.69	22.03	76.27
Udumalpet	27	31	33	75	6	10	0	13	78
	29.67	34.07	36.26	82.42	6.59	10.99	0	14.29	85.71
Uthangarai	38	75	89	52	44	106	5	60	137
	18.81	37.13	44.06	25.74	21.78	52.48	2.48	29.70	67.82
Villupuram	11	5	0	0	0	16	2	14	0
	68.75	31.25	0	0	0	100	12.5	87.5	0
Total samples	688	1019	923	912	512	1184	169	828	1563
	26.16	38.75	35.1	34.67	19.4	45.01	6.42	31.4	59.4

the quality of these leaves directly impacts the stability of silkworm production (Aruga, 1994; Subbaswamy *et al.*, 2001). The research aimed to evaluate the macro- and micro-nutrient levels in the soils of Tamil Nadu, especially where mulberry is grown.

Materials and Methods

This study was conducted from 2020 to 2022 at the Regional Sericultural Research Station in Salem, involved the collection and analysis of 2,630 soil samples from 26 mulberry cultivation clusters and non-captive areas in Tamil Nadu. pH and Electrical Conductivity were determined using the method by Jackson (1973) at a 1:25 soil-to-water ratio. Organic Carbon was determined via the titration technique outlined by Walkley and Black (1934). Nitrogen levels were quantified using the Kjeldahl method (Kjeldahl, 1883). Phosphorus content was evaluated following the Olsen procedure (Olsen *et al.*, 1954). Potassium was gauged using the Flame Photometer method as described by Jackson (1973). Sulfur was assessed using the Turbidometric approach at 440 nm (Black *et al.*, 1965). Micronutrients, including Zinc (Zn), Copper (Cu), Manganese (Mn) and

Table 2: Sulphur and micronutrients status in mulberry growing soils of Tamil Nadu State

Name of the clusters and non-captive areas	No. of samples	Sulphur (S) (ppm)			Zinc (Zn) (ppm)			Iron (Fe) (ppm)		
		L	M	H	L	M	H	L	M	H
Adaikalapattinam	104	22	43	39	57	21	26	88	14	2
	%	21.15	41.35	37.5	54.81	20.19	25	84.62	13.46	1.92
Alangayam	89	83	5	1	57	25	7	79	10	0
	%	93.26	5.62	1.12	64.04	28.08	7.87	88.76	11.24	0
Alangudi	103	55	15	33	42	34	27	47	43	13
	%	53.4	14.56	32.0	40.78	33.0	26.2	45.63	41.75	12.6
Berigai	160	74	29	59	50	51	59	141	13	6
	%	46.25	18.13	35.8	31.25	31.88	36.8	88.13	8.13	3.75
Bhavani	100	17	66	17	29	63	8	91	9	0
	%	17	66	17	29	63	8	91	9	0
Dharmapuri	120	67	29	24	71	33	6	68	50	2
	%	55.83	24.17	20	59.17	27.5	5	56.67	41.67	1.67
Gobichet Ipalayam	100	9	21	70	80	17	3	83	14	3
	%	9	21	70	80	17	3	83	14	3
Gudimangalam	38	1	12	25	32	5	1	31	6	1
	%	2.63	31.58	65.7	84.21	13.16	2.63	81.58	15.79	2.63
Keeranur	33	9	8	16	27	6	0	27	6	0
	%	27.27	24.24	48.4	81.82	18.18	0	81.82	18.18	0
Komaralingam	42	10	19	13	26	7	9	42	0	0
	%	23.81	45.24	30.9	61.9	16.67	21.4	100	0	0
Madathukulam	121	26	41	54	50	40	31	88	31	2
	%	21.49	33.88	44.6	41.32	33.06	25.6	72.73	25.62	1.65
Manurpalayam	55	42	13	0	36	12	7	0	0	55
	%	76.36	23.64	0	65.45	21.82	12.7	0	0	100
Namakkal	345	205	121	19	232	86	27	326	19	0
	%	59.42	35.07	5.51	67.25	24.93	7.83	94.49	5.51	0
Oddanchatiram	89	2	13	0	61	18	10	73	16	0
	%	2.25	14.61	0	68.54	20.22	11.2	82.02	17.98	0
Palani	7	0	1	6	6	0	1	7	0	0
	%	0	14.29	85.7	85.71	0	14.2	100	0	0
Pennagaram	348	244	93	11	253	55	40	298	47	3
	%	70.11	26.72	3.16	72.7	15.8	11.4	85.63	13.51	0.86
Pitchandapalayam	100	1	24	75	78	11	11	84	13	3
	%	1	24	75	78	11	11	84	13	3
Pollachi	101	15	26	60	56	26	19	76	19	6
	%	14.85	25.74	59.4	55.45	25.74	18.8	75.25	18.81	5.94
Poolavadi	72	2	15	55	37	26	9	33	29	10
	%	2.78	20.83	76.3	51.39	36.11	12.5	45.83	40.28	13.8
Pongalur	12	0	0	12	10	0	2	12	0	0
	%	0	0	100	83.33	0	16.6	100	0	0

Table 1: Continue...

Name of the clusters and non-captive areas	No. of samples	Sulphur (S) (ppm)			Zinc (Zn) (ppm)			Iron (Fe) (ppm)		
		L	M	H	L	M	H	L	M	H
Salem	54	24	26	4	2	30	22	32	21	1
	%	44.44	48.15	7.41	3.7	55.56	40.7	59.26	38.89	1.85
Sanarpatti	10	0	0	10	5	1	4	4	6	0
	%	0	0	100	50	10	40	40	60	0
Sriviiliputtur	118	16	37	65	98	14	6	111	7	0
	%	13.56	31.36	55.0	83.05	11.86	5.08	94.07	5.93	0
Udumalpet	91	0	37	54	65	14	12	71	20	0
	%	0	40.66	59.3	71.43	15.38	13.1	78.02	21.98	0
Uthangarai	202	75	76	51	48	53	101	165	32	5
	%	37.13	37.62	25.2	23.76	26.24	50.0	81.68	15.84	2.48
Villupuram	16	14	2	0	5	2	9	6	9	1
	%	87.5	12.5	0	31.25	12.5	56.2	37.5	56.25	6.25
Total samples	2630	1013	772	773	1513	650	457	2083	434	113
	%	38.52	29.35	29.3	57.5	24.71	17.3	79.20	16.5	4.29

Table 1: Continue...

Name of the clusters and non-captive areas	No. of samples	Iron (Fe) (ppm)			Manganese (Mn) (ppm)			Cupper (Cu) (ppm)		
		L	M	H	L	M	H	L	M	H
Adaikalapattinam	104	80	17	7	1	3	100	0	0	104
	%	76.92	16.35	6.73	0.96	2.88	96.2	0	0	100
Alangayam	89	74	15	0	16	19	54	1	3	85
	%	83.15	16.85	0	17.98	21.4	60.7	1.12	3.37	95.51
Alangudi	103	17	19	67	4	9	90	0	10	93
	%	16.5	18.45	65.05	3.88	8.74	87.4	0	9.71	90.29
Berigai	160	122	33	5	58	94	8	60	7	93
	%	76.25	20.63	3.13	36.25	58.8	5	37.5	4.38	58.13
Bhavani	100	100	0	0	0	7	93	0	1	99
	%	100	0	0	0	7	93	0	1	99
Dharmapuri	120	110	10	0	36	45	39	0	5	115
	%	91.67	8.33	0	30	37.5	32.5	0	4.17	95.3
Gobichet Ipalayam	100	99	1	0	0	9	91	0	0	100
	%	99	1	0	0	9	91	0	0	100
Gudimangalam	38	34	4	0	0	18	20	0	8	30
	%	89.47	10.53	0	0	47.4	52.6	0	21.05	78.95
Keeranur	33	31	0	2	8	5	20	5	3	25
	%	93.94	0	6.06	24.24	15.2	60.6	15.1	9.09	75.76
Komaralingam	42	37	5	0	10	12	20	8	3	31
	%	88.1	11.9	0	23.81	28.6	47.6	19.0	7.14	73.81
Madathukulam	121	10	38	73	33	47	41	29	8	84
	%	8.26	31.4	60.33	27.27	38.8	33.9	23.9	6.61	69.42
Manurpalayam	55	55	0	0	1	11	43	0	0	55
	%	100	0	0	1.82	20	78.2	0	0	100

Name of the clusters and non-captive areas	No. of samples	Iron (Fe) (ppm)			Manganese (Mn) (ppm)			Cupper (Cu) (ppm)		
		L	M	H	L	M	H	L	M	H
Namakkal	345	97.97	2.03	0	34.2	18.6	47.3	0.29	2.61	97.1
	%	89	0	0	1	5	83	0	0	89
Oddanchatiram	89	100	0	0	1.12	5.62	93.3	0	0	100
	%	7	0	0	0	0	7	0	1	6
Palani	7	100	0	0	0	0	100	0	14.2	85.71
	%	313	30	5	248	47	53	34	24	290
Pennagaram	348	89.94	8.62	1.44	71.26	13.5	15.2	9.77	6.9	83.33
	%	98	2	0	1	11	88	0	2	98
Pitchandapalayam	100	98	2	0	1	11	88	0	2	98
	%	91	6	4	10	45	46	0	6	95
Pollachi	101	90.10	5.94	3.96	9.90	44.55	45.5	0	5.94	94.06
	%	70	2	0	0	23	49	1	2	69
Poolavadi	72	97.22	2.78	0	0	31.9	68.1	1.39	2.78	85.83
	%	12	0	0	6	4	2	0	0	12
Pongalur	12	100	0	0	50.00	33.33	16.6	0	0	100
	%	42	3	9	10	9	35	0	0	54
Salem	54	77.78	5.56	16.67	18.52	16.7	64.8	0	0	100
	%	10	0	0	0	0	10	0	1	9
Sanarpatti	10	100	0	0	0	0	100	0	10	90
	%	105	13	0	0	20	98	0	8	110
Sriviiliputtur	118	88.98	11.02	0	0	17	83.1	0	6.78	93.22
	%	89	1	1	10	37	44	2	4	84
Udumalpet	91	97.80	1.10	1.10	10.99	40.66	48.3	2.20	4.40	92.31
	%	181	0	21	39	81	82	2	17	183
Uthangarai	202	89.60	0	10.40	19.31	40.10	40.5	0.99	8.42	90.59
	%	14	2	0	0	1	15	0	0	16
Villupuram	16	87.5	12.5	0	0	6.25	93.8	0	0	100
	%	2228	208	194	610	626	1394	143	122	2364
Total samples	2630	84.71	7.90	7.37	23.19	23.8	53	5.43	4.63	89.88
	%	84.71	7.90	7.37	23.19	23.8	53	5.43	4.63	89.88

Iron (Fe), were measured using the Atomic Absorption Spectrophotometer-DTPA extraction technique (Lindsay and Norvell, 1978). Boron was determined utilizing the Azomethine-H reagent method (John *et al.*, 1975). The study was carried out using a Randomized Block Design and the data were evaluated through one-way analysis of variance.

Results and Discussion

Nutrient Richness and Secondary Elements in Mulberry Soils of Tamil Nadu

The soil survey conducted across various mulberry cultivation areas in Tamil Nadu revealed significant information about the soil properties. A significant 83.27% of the soil samples were identified as alkaline, with pH values ranging from 7.8 to 10.66. All samples exhibited non-saline properties, as evidenced by electrical conductivity (EC) values below 1.0 mmho cm^{-1}. 64.33% of the samples were categorized, in terms of organic carbon content, as low (<0.65%), while 30.22% were classified within the medium range (0.65-1.0%). The survey also showed that available nitrogen levels were high (>560 kg ha^{-1}) in 35.10% of the samples and medium (260-560 kg ha^{-1}) in 38.75%.

Among the 2360 samples analyzed, 912 (34.67%) had low (<15 kg P_2O_5 ha^{-1}) and 1184 (45.01%) had high (>25 kg P_2O_5 ha^{-1}) levels of available phosphorus. Available potassium was high (>240 kg K_2O ha^{-1}) in 1563 (59.43%) of the samples, while 31.48% of the samples were medium (120-240 kg K_2O ha^{-1}). Available sulfur contents were sufficient (10-15 ppm)

in 29.35% of the samples, high (>20 ppm) in 38.52% and low (<10 ppm) in the remaining samples. These findings are crucial for soil management and nutrient application strategies aimed at enhancing crop growth in Tamil Nadu's mulberry growing regions, as shown in table 1 and 2. The results are consistent with previous studies by Chitdeshwari *et al.* (2019), Chitra (2020) and Dhahira Beevi and Devamani (2020).

Status of Soil Micro-Nutrients in Mulberry Cultivation Areas of Tamil Nadu

Out of the 2,630 soil samples analyzed, a significant portion, between 57.52% and 84.71%, showed deficiencies in DTPA-extractable micronutrients, specifically zinc, boron and iron (below 0.6, 0.5 and 4.5 ppm, respectively). In contrast, 53% of the samples had elevated levels of manganese (Mn) and 89.88% had high levels of copper (Cu) (above 4 and 0.4 ppm, respectively), as detailed in table 2. Zinc and iron deficiencies are common micronutrient issues across different agro-climatic zones and an increase in Mn and Cu levels was noted in soils deficient in zinc, consistent with earlier findings (Maragatham *et al.*, 2014; Jegadeeswari *et al.*, 2017; Chitdeshwari *et al.*, 2019; Dhahira Beevi and Devamani, 2020; Devamani *et al.*, 2024).

Micronutrients, though required in trace amounts, play a crucial role in plant enzymatic activity. The current study revealed that most soils were red, alkaline and normal in salinity, with low organic carbon, zinc, boron and iron but sufficient sulfur and medium to high levels of available N, P, K and Mn. Elevated copper (Cu) levels were also detected in both captive and non-captive mulberry cultivation regions of Tamil Nadu. These results are consistent with findings from previous studies in mulberry growing states (Thimmareddy *et al.*, 1999; Sheeja, 2015; Sudhakar *et al.*, 2018, 2019, 2020; Devamani *et al.*, 2024). The elevated levels of Mn and Cu observed in soils deficient in Zn and Fe align with findings reported by Chitdeshwari *et al.* (2019) and Chitra (2020).

Conclusion

Soil tests for mulberry cultivation in Tamil Nadu reveal that the soils are generally well-suited for mulberry growth. The pH ranges from moderately alkaline to alkaline, with neutral salinity. Despite low organic carbon levels, the soils show medium to high nitrogen and potassium availability, while phosphorus and sulfur levels vary. DTPA-extractable micronutrients like boron, zinc and iron are generally low to sufficient, whereas manganese and copper are adequate to high. To boost soil fertility, it's advised to increase organic carbon with organic manures and apply sulfur-containing fertilizers to reduce soil pH, enhancing nutrient availability and promoting healthy mulberry cultivation.

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